DMT
DANISH MYO TECHNOLOGY

AUTOMATIC BUFFER FILLER SYSTEM

MODEL 625FS

User Manual
Version 1.2

AUTOMATIC BUFFER FILLER SYSTEM
MODEL 625FS

USER MANUAL

TRADEMARKS

DMT reserves the right to alter specifications as required.
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New information may be supplied separately.

This documentation is provided with the DMT Automatic Buffer Filler System – Model 625FS

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INTRODUCTION

All DMT 4-channel myographs systems; the 610M/620M/700MO/720MO/800MS and 820MS have built-in suction activated by the press of a button that empties the bath. The user fills the bath again manually with pre-warmed buffer from bottles with, for example, a pipette.

Manual filling presents a risk of inconsistency across the four baths, effecting the accuracy of results.

There is a danger of knocking and damaging a transducer with a pipette tip.

Furthermore, consideration should be given to the risk of repetitive strain injury, particularly for those manually filling multiple four-chamber systems in parallel.

To eliminate the above mentioned issues DMT has developed the Automatic Buffer Filler System - 625FS. The 625FS can be easily mounted on all our four-chamber systems, and makes it possible to fill one specific chamber or all chambers at once with pre-selected volumes simply by pressing a button.

SAFETY

The Automatic Buffer Filler System - 625FS has been designed for use only in teaching and research applications. It is not intended for clinical or critical life-care use and should never be used for these purposes, or for the prevention, diagnosis, curing, treatment, or alleviation of disease, injury, or handicap.

- Do not open the unit; the internal electronics pose a risk of electric shock.
- To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Objects filled with liquids should not be placed on the apparatus.
- Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat exchangers, stoves, or other equipment or devices that produce heat.
- Only use attachments and accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- This apparatus must be grounded.
- Use a three-wire grounding-type cord similar to the one supplied with the product.
- Do not modify the polarized or grounding-type plug. A polarized plug has two flat blades, one being wider than the other. A grounding type plug has two blades and a third (round) grounding pin. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Be advised that different operating voltages require the use of different types of line cord and attachment plugs. Check the voltage in your area and use the correct type. See the table below:

Voltage	**Line plug according to standard**
110–125 V	UL81 and CSA C22.2 No. 42
220–230 V	CEE 7 page VII, SR section 107-2-D1/IEC 83, page C4
240 V	BS 1363 of 1984. Specification for 13A fused plugs and switched and unswitched socket outlets.

Protect the power cord from being walked on or pinched, particularly at power outlets and the point where they connect to the apparatus.

Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, including damage to the power-supply cord or plug, liquid or objects having fallen into the apparatus, exposure to rain or moisture, abnormal operation, or having been dropped.

EMC/EMI

This equipment has been tested and complies with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by monitoring the interference while turning the equipment off and on), the user is encouraged to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different to that which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

APPROVALS

Complies with the EMC standards:	EN 61326-2-6:2005
EMC 89/336/EEC:	EN 61000-3-2
Certified with the safety standards:	
Directive 2006/95/EC:	EN 61010-1:2001
	EN 61010-1/Corr.1:2003
	EN 61010-1/Corr.1:2003
	EN 61010-2/101:2003

CERTIFICATE OF CONFORMITY

DMT A/S, Skejbyparken 152, 8200 Aarhus N., Denmark,
hereby declares its responsibility that the following product:

Automatic Buffer Filler System
Model 625FS

is covered by this certificate and marked with CE-label.
It conforms to the following standards:

EN 61010-1:2001 EN 61010-1/Corr.1:2003 EN 61010-1/Corr.1:2003	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.
EN 61010-2-101:2003	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2 – 101: Particular requirements for in vitro diagnostic (IVD) medical equipment.
EN 61326-2-6:2005	Electrical equipment for measurement, control and laboratory use – EMC Requirements – Part 2-6: Particular requirements In vitro diagnostic (IVD) medical equipment.
	With reference to regulations in the following directives: 2006/95/EC, 89/336/EEC.

ABOUT THIS MANUAL

This manual contains a complete list of procedures that describe how to install, maintain and use the Automatic Buffer Filler System - 625FS including several useful protocols for users using more than one buffer in their experiments.

Chapter 1 provides an overview of the construction and basic features of the 625FS.

Chapter 2 describes step-by-step instructions to mount the 625FS on DMT four-chamber myograph systems.

Chapter 3 describes how to use the 625FS.

Chapter 4 contains procedures describing general and daily maintenance of the 625FS.

Appendices contain additional information about custom filling volumes and system specifications.

UNPACKING THE AUTOMATIC BUFFER FILLER SYSTEM - 625FS

Take a few minutes to carefully inspect your new 625FS for damage which may have occurred during handling and shipping. If you suspect any kind of damage, please contact DMT immediately and the matter will be resolved. If the packing material appears damaged, please retain it until a possible claim has been settled.

We recommend that you store the packing material for any possible future transportation of the 625FS. In case of transportation and the original packing material is unavailable, please contact the DMT Sales Department for advice and packing instructions.

After unpacking your new 625FS, please use the following list to check that the system is complete:

- One 625FS Buffer Filler unit
- One power cord*
- Silicone tubing
- One 1litre buffer bottle
- One lid for the 1 litre bottle with three steel pipes; two for the recirculation of the buffer and a third for applying gas to your buffer.
- One screwdriver for mounting the 625FS onto your Multi Myograph System
- One CD with user manuals for Wire Myograph Systems

** The shape of the AC plug varies by country; be sure that the plug fits the outlets for your location.*

CHAPTER 1 - SYSTEM OVERVIEW

1.1 Automatic Buffer Filler System - 625FS front panel

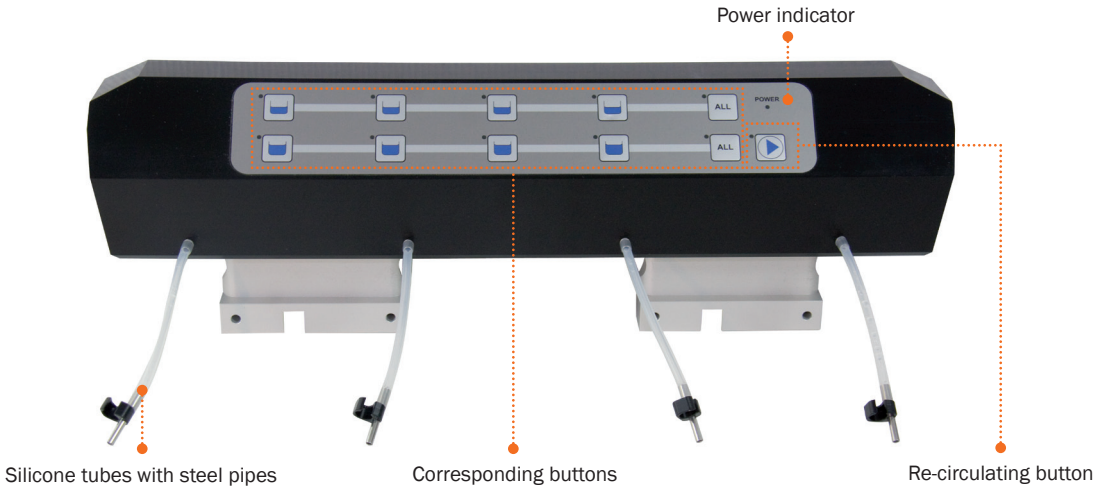

Figure 1.1 *Automatic Buffer Filler System - 625FS front panel*

On the front of the 625FS you have two rows of 'filling' buttons (figure 1.1 above)

And far to the right a button to activate the pump and purging of the 625FS system with buffer.

The top row is the buttons for filling specific chambers with the smaller volume

and the bottom row is for filling specific chambers with the larger volume.

To the far right the button marked is used to fill all four chambers simultaneously with either of the two volumes.

1.2 Automatic Buffer Filler System - 625FS rear panel

On the back of the 625FS there are three important connections (figure 1.2 below). The first one, marked "Power" on the lower left side of the panel is the 24 volts power connection. This is where the power converter is connected to the 625FS. The two other connections are steel pipes labeled "1=IN" and "3=OUT". Connection 1 is the inlet from the buffer flask and connection 2 is the outlet from the 625FS reservoir back to the buffer flask.

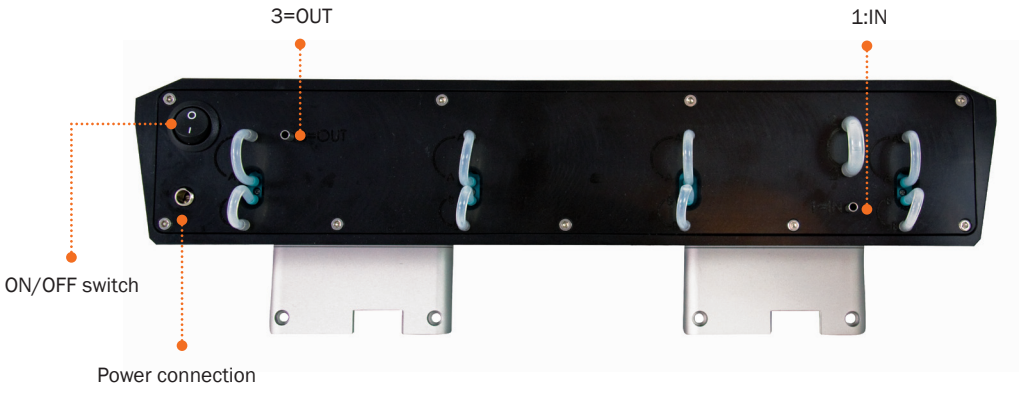

Figure 1.2 *Automatic Buffer Filler System - 625FS rear panel*

CHAPTER 2 - SETTING UP

2.1 Complete Automatic Buffer Filler System - 625FS

Figure 2.1 *Complete Automatic Buffer Filler System - 625FS with four chamber covers, tube and buffer flask*

2.2 Setting up step-by-step

This chapter contains a complete step-by-step description of how to mount the 625FS on top of all DMT's 4-channel Myograph systems.

2.2.1. Mounting the 625FS onto a 610M/700MO/800MS system

Unplug the power cord from your interface. Remove the four chambers from the interface.

Place the 625FS on top of the interface. The black mounting frame of the 625FS fits exactly around the heating plate of the interface when you have the keypad of the 625FS pointing towards you (figure 2.2 below).

The 625FS is securely fastened to the interface by two screws on the back of the black frame of the 625FS marked with orange circles in figure 2.3 below.

Figure 2.2 *Complete Multi Myograph System - 610M with the Automatic Buffer Filler System - 625FS*

Figure 2.3 *Fastening of the 625FS system onto the interface by tightening the two screws marked with orange circles.*

2.2.2. Mounting the 625FS onto a 620M/720MO/820MS system

Figure 2.4 *Multi Myograph System - 620M with the Automatic Buffer Filler System - 625FS mounted*

Unplug the power cord from your interface. Remove the four chambers from the interface.

Place the 625FS's two 'legs' onto the back edge of the heating plate of the interface.

Align the four screw holes of the 'legs' of the 625FS with the four screw holes on the back of the heating plate of the interface (figure 2.5 below). Use the supplied four screws and the Allen Key to fasten the 625FS securely to the interface.

Figure 2.5 *Fastening of the 625FS system onto the interface by tightening the two screws marked with orange circles.*

2.2.3 Buffer flask connection to the 625FS

- Place the black lid with the three steel pipes onto the supplied buffer flask (figure 2.6).
- Use the supplied 3mm silicone tube to connect the steel pipe marked “1” on the buffer flask lid (figure 2.7A below) with the “1=IN” on the back of the 625FS (figure 2.8 below).
- Use the supplied 3mm silicone tube to connect the steel pipe marked “3” on the buffer flask lid (figure 2.7B below) with the outlet “3=OUT” on the back of the 625FS (figure 2.8 below).

Figure 2.6 Buffer flask with black lid

Figure 2.7 A-B *Black lid for buffer flask with steel pipe and silicone tubes*

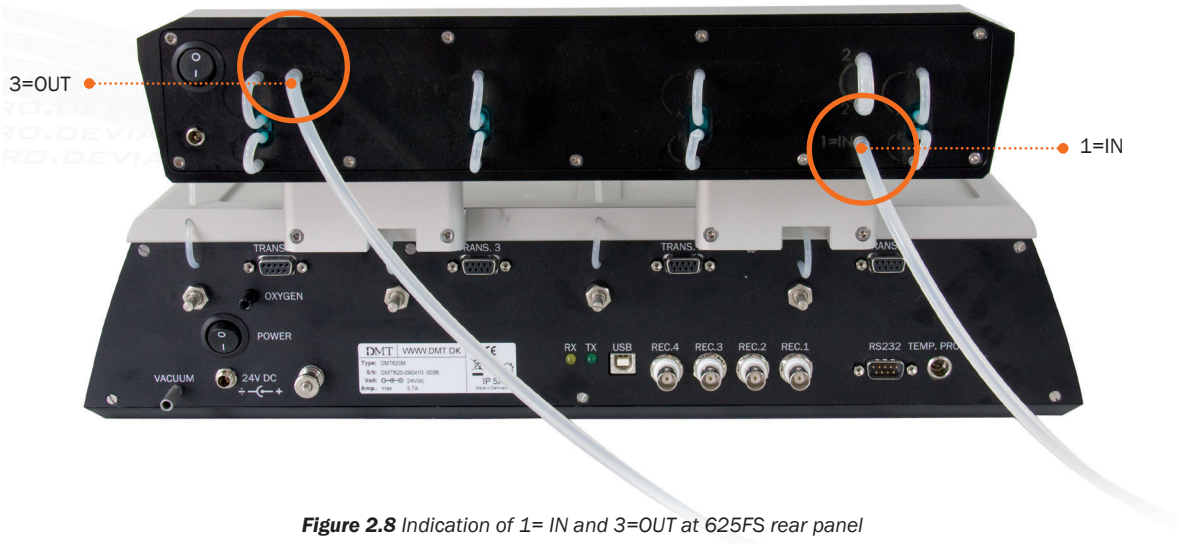

Figure 2.8 *Indication of 1= IN and 3=OUT at 625FS rear panel*

2.3 Connect 625FS buffer outlet to the four chambers

On the front of the 625FS are four short steel pipes where silicone tubes with vacuum pipe clasps are attached (figure 2.9A below).

These tubes from the 625FS should now be connected to the vacuum pipes assigned to each myograph chamber, see figure 2.9 B below).

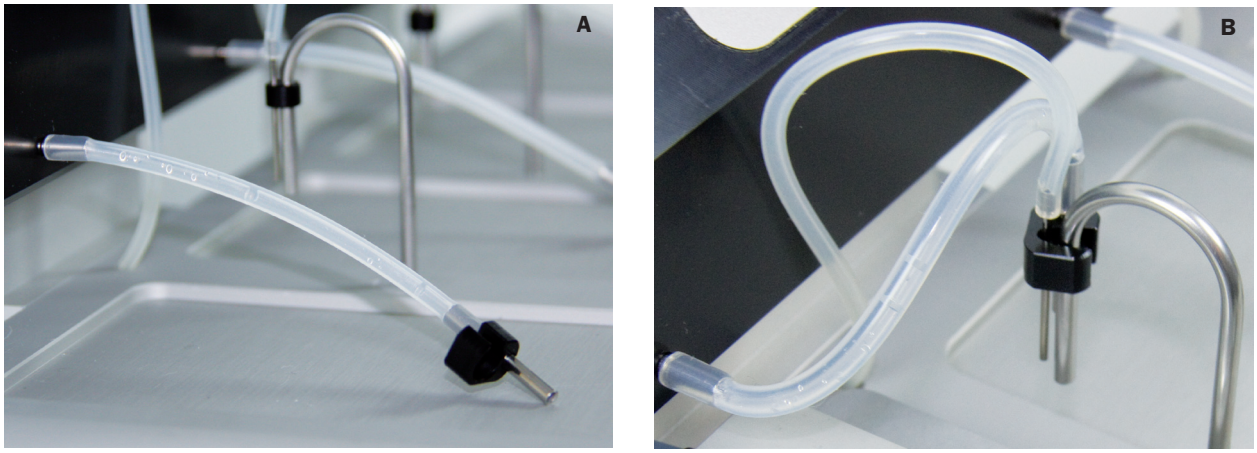

Figure 2.9, A-B *Steel pipe with silicone tube and clasps*

Lift the vacuum pipes by gently pulling up on the neck of the pipe (figure 2.10A below). Turn it 90° clockwise and gently lower it onto the heating plate. Each silicone tube is attached to a vacuum pipe by clicking on the black clasps.

The vacuum pipes are inserted into the chamber by gently pulling up on the neck of the pipe, turning it 90° counter-clockwise and gently lowering it into the chamber as shown in figure 2.10B below.

NOTE:
THE TRANSDUCERS ARE FRAGILE AND SENSITIVE TO MECHANICAL STRAIN. BE VERY CAREFUL WHEN LOWERING THE STEEL PIPES INTO THE CHAMBER THAT THEY DO NOT HIT THE PINS OR JAWS IN THE CHAMBER!

These buffer inlet tubes should now be positioned close to the wall of the myograph chamber as possible. Adjust the buffer inlet and gas supply pipes in such a way that they are close to the wall of the chamber, and have a minimum effect on the mounted tissue. It is important to position the inlet pipes in the same position in each chamber.

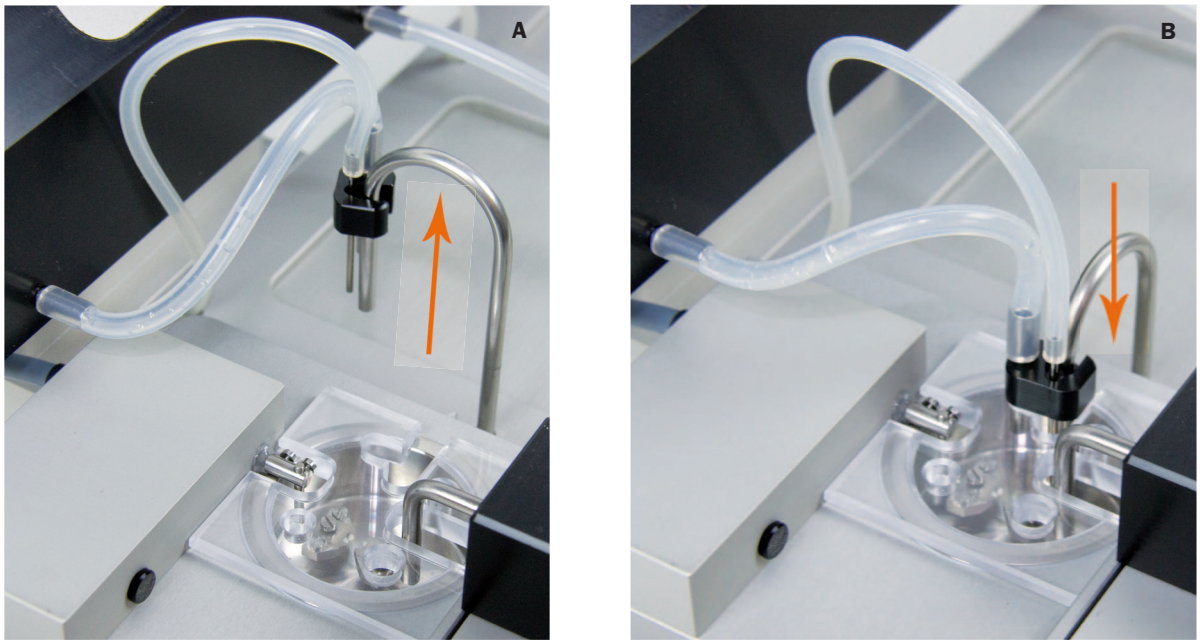

Figure 2.10, A-B *Steel pipe with silicone tube, attached to vacuum pipe*

2.4 Chamber Covers

The chamber covers that come with the 625FS (figure 2.11 A) have been modified to accommodate the additional buffer inlet. The original covers that were supplied with your Multi Myograph System (figure 2.11B) should be set aside. The covers help maintain temperature and other buffer conditions (gas tension, pH). Holes in the chamber covers serve different purposes, and they are illustrated in figure 2.12.

Figure 2.11 A-B *625FS chamber cover and 620M chamber cover*

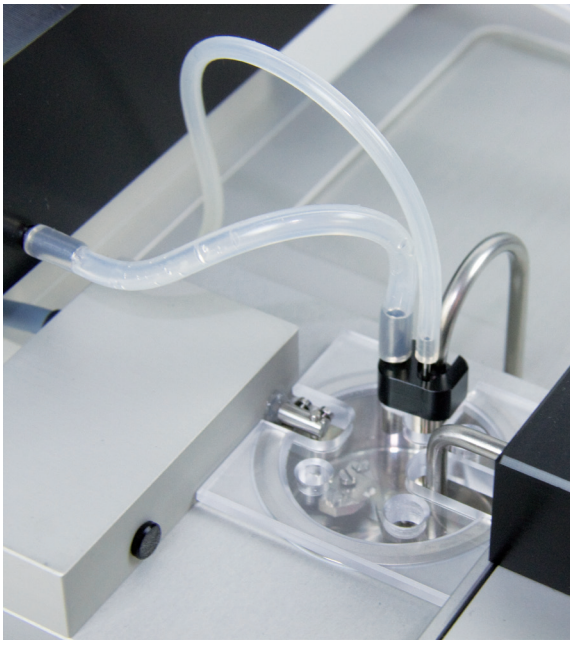

Figure 2.12 *Modified chamber cover for 625FS*

CHAPTER 3 - USE OF THE AUTOMATIC BUFFER FILLER SYSTEM

3.1 General use of the Automatic Buffer Filler System - 625FS

1. Connect all the tubing as described in Chapter 2 and place the buffer flask of up to 700ml of buffer in a pre-heated water bath. Try to keep the tubing between the buffer flask and the 625FS as short as possible.

2. Activate the 're-circulating' button at least 5 minutes before use, to ensure that the reservoir inside the 625FS is filled with buffer that is very close to the temperature of the water bath. The re-circulating button activates a pump that will re-circulate the buffer from the flask through the 625FS and back to the flask.

RE-CIRCULATION

3. The re-circulating pump has a high flow rate to ensure that the temperature in the reservoir will remain constant.

IMPORTANT:
THE 'RE-CIRCULATION' BUTTON MUST BE ACTIVATED AT LEAST 5 MINUTES BEFORE USE OF THE FILLER FUNCTION AND NOT DEACTIVATED BEFORE THE END OF THE EXPERIMENT.

4. A specific chamber can be filled by pressing the corresponding button for that chamber on the 625FS with either the larger volume (the lower button) or the smaller volume (upper button).

LARGE VOLUME

5. All four chambers can be filled simultaneously by pressing the "all" button for either the larger or the smaller volumes.

SMALL VOLUME

WARNING:
REMEMBER TO EMPTY THE CHAMBERS BEFORE RE-FILLING OTHERWISE THEY WILL OVERFLOW AND RISK HARMING THE MYOGRAPH INTERFACE.

ALL

CHAPTER 4 - MAINTENANCE OF AUTOMATIC BUFFER FILLER SYSTEM

4.1 Cleaning the 625FS

DMT strongly recommends that the 625FS is cleaned after each experiment or at the end of the day, using the following procedure:

1. Follow the 'return' tube coming from the port marked "3=OUT" on the back of the 625FS. Detach the tube from the buffer flask lid and place it in a waste container.

2. The buffer flask lid is detached and placed in an empty bottle or just held up in the air as shown in figure 4.1 below.

Figure 4.1 *Position of the lid and steel pipes to empty tubes and filler reservoir of buffer*

3. Press the button to start the recirculation pump.

4. The buffer reservoir in the 625FS will now be emptied into the waste container. After 30 seconds the buffer reservoir will be empty.

5. Place the buffer flask lid in a container with distilled water for at least 120 seconds. During this period fill and empty the chambers of the Multi Myograph three times using the larger volume button to clean the short tubing connecting the 625FS to the myograph chambers.

6. After 120 seconds of soaking with distilled water the buffer flask lid is again placed in an empty bottle or just held up in the air. After 60-120 seconds the 625FS is clean and empty.

4.2 Cleaning of 625FS Reservoir for salt

Routinely implement a cleaning procedure for the 625FS with 8% acetic acid to remove salt inside the reservoir chamber.

1. Prepare 500ml 8% acetic acid in the 1 liter flask. Place the 625FS lid on top of it.

2. Place the lid with the steel pipes in the 8% acetic acid and press the 'recirculating' button and let it run for 5 minutes. And then stop the pump.

3. Follow the 'return' tube coming from the port marked "3=OUT" on the back of the 625FS. Detach the tube from the buffer flask lid and place it in a waste container.

4. The flask lid is detached and placed in an empty bottle or just held up in the air. Press the button to start the recirculation pump.

5. After 30 seconds the buffer reservoir in the 625FS will be emptied of acetic acid.

6. Place the flask lid in a container of distilled water for at least 3-5 minutes. During this period fill and empty the chambers of the Multi Myograph three times with the larger volume button to clean the short tubing connecting the 625FS to the myograph chambers.

7. The buffer flask lid is again placed in an empty bottle or just held in the air. After 60-120 seconds the 625FS is clean and empty.

IMPORTANT NOTE:
NEVER SOAK THE SUPPORTS IN ANYTHING STRONGER THAN 8% ACETIC ACID FOR EXTENDED PERIODS OF TIME. DO NOT SOAK FOR HOURS OR OVERNIGHT!

APPENDIX 1 - CUSTOM SELECTED 625FS FILLER VOLUMES

If you prefer different filling volumes to the two default volumes, DMT will need the 625FS returned for setting and calibration.

DMT will set the new volumes within one week and return the 625FS to you.

APPENDIX 2 - SYSTEM SPECIFICATIONS

Technical specifications

Filling volumes:	6 ml and 8 ml (± 0,5 ml)
Custom volume range:	4-10 ml
Filling speed:	30 ml/min
Fill time 8ml:	typical 15 sec.
Fill time 5ml:	typical 10 sec.
Voltage:	100 to 240 VAC (auto) 50/60 Hz via external power supply
Power supply:	24VDC +-10%
Current max.:	1.0Amps.
Environmental humidity:	20% to 80% RH, non condensing.
Environmental operating temp.:	15-30°C.
Environmental storage temp.:	4 - 70°C.
Compatible with:	610M, 620M, 700MO, 720MO, 800MS, 820MS systems

NOTES

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